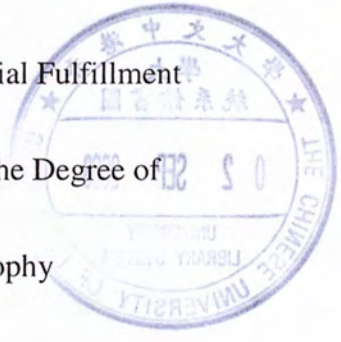
Strongly Favorable Statistic: Integrating Heuristic-Systematic Model (HSM) and Social Judgment Theory (SJT)

WONG, Sze Ka



A Thesis Submitted in Partial Fulfillment

of the Requirements for the Degree of

Master of Philosophy

In

Industrial-Organizational Psychology

September 2007

Thesis/Assessment Committee

Professor Wai Chan (Chair)
Professor Winton Wing-tung Au (Thesis Supervisor)
Professor Darius Kwan-shing Chan (Committee Member)
Professor Vicki J. Magley (External Examiner)

Abstract of thesis entitled (English):

The current study employed Heuristic-Systematic Model (HSM) and Social Judgment Theory (SJT) in understanding persuasion by strongly favorable transport reliability statistics (99.9% on time) in the case of a public transport corporation. First, both positive and negative heuristic processing employed when judging the strongly favorable reliability statistics was measured. It was hypothesized that positive and negative heuristic processing was positively and negatively related to favorable change in perceived reliability and general attitude (in terms of service and value for money) towards the transport corporation respectively. Second, according to HSM, message recipients who were more involved with the transport corporation were hypothesized to engage more in systematic processing. In turn, the effect of systematic processing on favorable attitude change was explored in this study. Third, according to SJT, the amount of assimilation or contrast was determined by two factors: 1) whether the strongly favorable reliability statistics fell on one's latitude of acceptance or rejection and 2) the discrepancy between the reliability statistics one thought the corporation achieved (own attitude) and that advocated in the message (message position). In turn, the amount of assimilation and contrast was hypothesized to relate positively and negatively to favorable attitude change respectively. Results indicted that favorable change in perceived reliability was only significantly predicted by discrepancy between one's own attitude and the message position. However, opposite to the proposition of SJT, the result of structural equation model showed that message recipients had more favorable change in perceived reliability when the discrepancy increased regardless of whether assimilation or contrast was induced (whether the strongly favorable reliability statistics fell on one latitude of acceptance or contrast). On the other hand, positive

heuristic processing and favorable change in perceived reliability could predict both favorable change in perceived service quality and value for money, while the former was shown to be a stronger predictor for both dependent variables. This supported the important role played by positive heuristic processing. Speculations for the present results, implication for practitioners, and limitation of the study were discussed.

Submitted by WONG sze-ka

for the degree of Master of Philosophy in Industrial-Organizational Psychology

at The Chinese University of Hong Kong in September 2007

Abstract of thesis entitled (Chinese):

這研究運用了法則性與系統化的訊息處理模式(Heuristic-Systematic Model)與社會評斷理論(Social Judgment Theory)去理解當顧客閱讀一家公共交通機構的非常高的交通準時數據(99.9%的準時程度)後的看法。首先，本研究量度了顧客閱讀交通準時數據時正反兩面的法則性訊息處理(heuristic processing)，並假定運用較多正面的法則性訊息處理的顧客會對該機構的準時程度和整體看法(服務和整和物有所值兩方面)變得愈好，而運用較多反面法則性訊息處理的顧客對該機構的看法會變得愈差。第二，跟據法則性與系統化的訊息的處理模式(Heuristic-Systematic Model)，對該機構愈有關聯(involvement)的顧客在閱讀交通準時數據時會運用較多的系統化訊息的處理模式(systematic processing). 我們繼而探討系統化訊息的處理模式(systematic processing)如何影響顧客對該機構的看法。第三，跟據社會評斷理論(Social Judgment Theory)，顧客閱讀交通準時數據後會出現多少同化(assimilation)或反差(contrast)是基於兩項因素: 1)非常高的交通準時數據位於顧客的接受區域(latitude of acceptance)或否決區域(latitude of rejection)和，2) 信息中的交通準時數據和顧客自己認爲該公司達到的準時程度的差異。顧客的同化(assimilation)程度愈高，對該機構的看法會變得愈好。相反，反差(contrast)程度愈高，對該機構的看法會變得愈差。跟據研究結果，只有信息中的交通準時數據和顧客自己認爲該公司達到的準時程度的差異能夠與顧客對該機構的準時程度看法產生顯著的關係。可是，與社會評斷理論(Social Judgment Theory)相反，本研究發現無論顧客在閱讀交通準時數據後是出現同化(assimilation)或反差(contrast)(取決於究竟非常高的交通準時數據位於顧客的接受區域或否決區域)，只要信息中的交通準時數據和顧客自己認爲該公司達到的準時程度的差異愈大，顧客對該機構的準時程度看法便會變得愈好。另外，研究結果顯示當顧客使用愈多正面的法則性訊息處理(positive heuristic processing)或對該機構的準時程度看法變好時其對該機構的服務和物有所值的看法皆會變

好。當中以正面的法則性訊息處理(positive heuristic processing)更能影響顧客對該機構的服務和物有所值的看法。這證明了正面的法則性訊息處理(positive heuristic processing)的重要性。最後，我們探討了本研究結果的原因、對機構的啓示、以及此研究的不足之處。

Submitted by WONG sze-ka

for the degree of Master of Philosophy in Industrial-Organizational Psychology

at The Chinese University of Hong Kong in September 2007

Acknowledgement

The author wishes to gratefully thank Professor Winton Au for his patient guidance and support throughout the research study. Special thanks are to the Public Transport Corporation which provided assistance throughout the study. Lastly, I am very grateful to research participants, who participated in the current study.

Table of Contents

List of Tables and Figures

Chapter 1. Introduction

There has been an increasing trend to apply research statistics for products and brand promotion. Reading through magazines, it is not surprising to discover that many advertisements have made use of research statistics for product promotion. Also, it is not uncommon for organizations to employ research statistics to demonstrate the effectiveness of their services and products. Several possible reasons are suggested for this trend. First, most people possess the persuasion heuristic cue that statements by experts are valid in their cognitive repertoire (Bohner, Ruder & Erb, 2002) based on their past experiences and observations (Eagly & Chaiken, 1993). The Elaboration Likelihood Model (ELM) suggests that research statistics a kind of expertise source, are seen by consumers to be more valid and persuasive. Moreover, research statistics are objective information in a sense that the physical attributes of the product are described with specific numbers. Compared with subjective information (i.e., either functional or symbolic outcomes of using the product), objective information is less subject to subjective interpretation and therefore leads to more favorable responses from consumers when the information is positive (Hsu, 1999).

However, are individuals necessarily persuaded by expertise or research statistics? Will expertise backfire? Expertise is a heuristic cue associated with

message content expectancy, that is, an individual expects convincing arguments in an expert's messages (Bohner et al., 2002). In an experiment conducted by Bohner et al. (2002), students who read weak arguments regarding tunnel projects presented by a high expertise source showed less favourable thoughts and attitudes than those who were exposed to a low expertise source. It was because of the mismatch between the expected and actual argument strength associated with the expertise (Bohner et al., 2002). This suggests that expertise does not work all the time. Does research statistics work like a kind of expertise? We suspect that strongly favorable research statistics may backfire in brand promotion in reality. For instance, if it is shown that the transport reliability of a public transport company reached the 99.9%, are customers necessarily persuaded by such a strongly favorable statistics? Moreover, supposing the message recipients are not persuaded, will the brand image be even worsened?

While expertise and research statistics are long believed as influential persuasion techniques, the above illustrated its potential harmful consequences. Undoubtedly, it is costly for a company to invest a huge amount of money on research hoping to show the significance of the product but ending up with negative product or even brand images. Together with the fact that an increasing trend to apply research statistics in promoting a wide range of products and services is

forecasted, it is important to examine the issue. Consistently, Bohner et al. (2002) pointed out the importance of studying whether and when a contrastive processing bias against expertise would spontaneously appear in everyday situations. All in all, it is crucial and worthwhile examining the process and factors associated with the success or failure of strongly favorable research statistics in product promotion. The current study focused on the use of strongly favorable statistics as organizations only utilize favorable statistics to support and promote their services. Moreover, to understand the phenomenon in great details, it is crucial to integrate theories within real-life settings to achieve an effective symbiosis between researchers and practitioners (Zaccaro & Horn, 2003). In this respect, the current study did not only limit the scope to the application of research statistics in a real-life organization – a public transport corporation, but also examined the process and effectiveness of using strongly favorable research statistics to promote the public transport corporation both theoretically and practically. Theoretically, two popular theories of attitude change, the Heuristic-Systematic Model (HSM) and Social Judgment Theory (SJT) were employed in the study framework. Practically, the public transport corporation customers were interviewed to identify a comprehensive list of factors accounting for the processing and effectiveness of strongly favorable transport reliability statistics to be included in the final questionnaire.

Thus, in a practical sense, the current study examined the effectiveness of strong research statistics and factors influencing recipients' perception of the message, which can serve as a reference when companies employ research statistics in future promotion. In a theoretical perspective, the present study was significant in attempting to include elements of the HSM and SJT to build up a model that explains attitude change and persuasion by strongly favorable statistics. The following sections review some basic concepts of HSM and JST and the associated factors before proposing the hypotheses.

The Heuristic-Systematic Model (HSM)

Both the elaboration likelihood model (ELM) and the heuristic-systematic model (HSM) postulated that there were two mediational paths to persuasion, namely peripheral and central processing for the former and heuristic and systematic processing for the latter (Chaiken & Eagly, 1983). In contrast to the ELM, the HSM supported that heuristic and systematic processing could co-occur (Eagly & Chaiken, 1993). Perceivers engaged in heuristic processing focused on a subset of information that enabled them to rely on simple decision rules or cognitive heuristics (such as "experts' statements can be trusted") when making judgments (Tversky & Kahneman, 1974). As heuristic processing requires less cognitive effort and resources, it was considered as a more limited information processing mode. On the other hand,

systematic processing was a more comprehensive and analytical information processing mode where much information was accessed and scrutinized by perceivers to judge the message (Eagly & Chaiken, 1993). The concurrent processing assumption of HSM held that the two processes could exert independent (additive) and interdependent (interactive) impacts on message judgment (Chaiken, 1987). Particularly, the relative extent and impact of heuristic and systematic processing is guided by the efficiency and sufficiency principles. The efficiency principle asserted that individuals preferred less effortful modes of processing thus favoring the use of heuristic processing to systematic processing (Eagly & Chaiken, 1993). On the other hand, the sufficiency principle held that people had to attain some desired judgmental confidence level (the confidence level one aspires to reach) in a given judgment setting (Eagly & Chaiken, 1993). This implies that individuals would engage in heuristic and systematic processing until the actual confidence was satisfied (Eagly & Chaiken, 1993). To strike a balance between minimizing processing efforts and satisfying judgmental confidence, one will engage in heuristic processing first and stop if enough judgmental confidence is generated but continues to exert effort on systematic processing until reaching the sufficiency threshold if heuristic processing alone does not generate enough confidence.

Positive and negative heuristic processing

The strength of heuristic processing is determined by a number of factors. Several cognitive principles govern the use of heuristics processing, namely, the availability, accessibility and reliability of the heuristics for the perceiver. First, availability refers to the fact that a particular heuristic could be influential in one's attitude change only if it was learned and represented in one's memory (Eagly & Chaiken, 1993). For example, if the heuristic cue "research statistics can be trusted" was not available in one's memory, one would not rely on this heuristic cue during heuristic processing. However, an available heuristic is not sufficient to affect attitude change unless it was activated or accessed from memory (Eagly & Chaiken, 1993). This suggested that for a heuristic cue to be processed heuristically and impact attitude change, it has to be accessible rather than merely available. Furthermore, accessible heuristic cues differ in their perceived reliability. Specifically, the heuristic cue that was perceived as more reliable (e.g., "research statistics can always be trusted" vs. "research statistics can generally be trusted") exerted a greater impact on attitude change (Eagly & Chaiken, 1993). Heuristic availability by itself is not sufficient to affect attitude change. In addition, there is a methodological concern that we can hardly measure heuristic availability independently from heuristic accessibility (an individual can hardly distinguish if a heuristic cue is only available in their mind but that it is not activated). Therefore, the current study only explored

the effect of accessibility and reliability of heuristic cues. In other words, the subsequent strength of the impact of heuristic processing on attitude change was measured by the accessibility and reliability of heuristic cues for an individual. Particularly, heuristic processing exerts a stronger effect on attitude change if the heuristic cue is accessible and perceived as more reliable. That is, when an individual reads the strongly favorable transport reliability statistics provided by the public transport corporation, the influence of heuristic processing on her attitude change toward the public transport corporation will be greater if more heuristic cues have also been activated.

Apart from the strength of influence of heuristic processing, the direction of heuristic processing affects attitude change too. Heuristic cues can be positive (E.g. research statistics can be trusted) or negative (E.g. research statistics is playing around with numbers only). When an individual read the strongly favorable reliability transport statistics and use more positive heuristic cues, a more favorable attitude change toward a higher perceived transport reliability of the corporation will be induced and vice versa. Combining both the strength and direction of heuristic processing, the following hypotheses were proposed:

H_{1a}: The extent of *positive heuristic processing* (in terms of the accessibility of more reliable positive heuristic cues) will be positively related to *favorable change in*

perceived transport reliability statistics of the public transport corporation

Although the message provided by the public transport corporation mainly dealt with the strongly favorable reliability statistics, there was information briefly describing the services provided by the corporation, which might also induce a more favorable change in general attitude (in terms of both perceived service quality and value for money) toward the corporation after being exposed to the message as positive heuristic cues regarding the corporation might be activated.

H_{1b}: The extent of *positive heuristic processing* (in terms of the accessibility of more reliable positive heuristic cues) is positively related to f*avorable change in perceived service quality of the public transport corporation.*

H_{1c}: The extent of *positive heuristic processing* (in terms of the accessibility of more reliable positive heuristic cues) is positively related to f*avorable change in perceived value for money of the public transport corporation.*

On the "vice versa",

H_{2a}: The extent of *negative heuristic processing (*in terms of the accessibility of more reliable negative heuristic cues) is negatively related to *favorable change in perceived transport reliability statistics.*

H_{2b}: The extent of *negative heuristic processing* (in terms of the accessibility of more reliable negative heuristic cues) is negatively related to *favorable change in*

service quality.

H_{2c}: The extent of *negative heuristic processing* (in terms of the accessibility of more reliable negative heuristic cues) is negatively related to *favorable change in value for money.*

Systematic processing and involvement with the corporation

On the other hand, motivation was required for systematic processing to occur according to both ELM and HSM (Eagly & Chaiken, 1993). If an individual was motivated to process the message, one's desired sufficiency judgmental confidence threshold would be high (Eagly & Chaiken, 1993). Therefore, it is likely that heuristic processing will fail to generate sufficient confidence and one will engage in systematic processing until the actual sufficiency level matches the desired sufficiency level. Consistently, Chaiken (1980) supported that involvement motivated message recipients to process issue-relevant information discussed in a message (i.e. systematic processing). With reference to Chaiken, Liberman and Eagly (1989), participants were motivated to process information systematically if the message was personally relevant and involved important consequences to them. Thus, involvement with the public transport corporation was operationalized as value-involvement and outcome-involvement in this study. Value-involvement was defined as "the psychological state that is created by the activation of attitudes that are linked to

important values" (Johnson & Eagly, 1989, p. 290). For instance, if one regards using a transport mean to ensure she is on time as very important, she has high value involvement with the public transport corporation. On the other hand, outcome-involvement was the extent to which an issue was important to one's goals and outcome thus making the issue salient for an individual (Johnson & Eagly, 1989). For example, a frequent user of that public transport corporation should find whether the corporation achieves good transport reliability important as it will affect her life (i.e., outcome relevant). Therefore, an individual with high value- and outcome-relevant involvement with the transport corporation will find merely engaging in heuristic processing of the strongly favorable reliability statistics hardly generates sufficient confidence in their resulting attitude. To achieve a higher sufficiency threshold, one will engage in systematic processing to process the content of the message – information related to strongly favorable reliability statistics, carefully and analytically to determine its argument strength and make attitudinal judgments accordingly. Hence,

H_3: If message recipients endorse higher *involvement with the public transport corporation* (in terms of the value- and outcome-relevant), they will engage more in *systematic processing*.

When individuals process the message content systematically, positive or

negative thoughts would be generated depending on the beliefs of the particular individual. Hence, the current study didn't specify but explored the direction of systematic processing on attitude change.

H_{4a}: The extent of *systematic processing* is related to *favorable change in perceived reliability statistics*.

H_{4b}: The extent of *systematic processing* is related to *favorable change in service quality.*

H_{4c}: The extent of *systematic processing* is related to *favorable change in value for money.*

Social Judgment Theory (SJT)

With reference to HSM, whether one will be persuaded by the train reliability statistics depends on the confidence of persuasion generated through heuristic and systematic processing. Other than engaging in heuristics and systematic processing, participants would judge whether the statistics lay within their latitudes of acceptance or noncommitment stated in Social Judgment Theory (SJT). It was speculated that after reading the "99.9%" transport reliability statistics, even though enough confidence has been generated through heuristic and systematic processing, a "99.9%" reliability may backfire because it goes beyond the latitude of acceptance as stipulated by SJT. If the transport reliability statistics is within the latitude of

rejection, contrast occurs so that no or even negative attitude change results.

Unlike other theories assuming attitude as a single point along an evaluative continuum, SJT conceptualized attitudes as a range of acceptable attitudinal positions along the continuum (Eagly & Chaiken, 1993). There are three regions along the continuum, namely latitude of acceptance (attitudinal positions along the continuum that one considers acceptable), latitude of noncommitment (the region of the continuum containing neither acceptable nor unacceptable beliefs) and latitude of rejection (attitudinal positions along the continuum that one considers unacceptable) (Eagly & Telaak, 1972). The attitude anchor is the position along the continuum that best matches an individual's attitude, for instance, one believes the transport reliability of the corporation to be 90%. Perceiver would treat his or her own attitudinal position as an anchor influencing where he or she perceived a persuasive message lay along the evaluative continuum (Eagly & Chaiken, 1993). The position of a message was perceived as closer to one's attitude anchor than it truly was (assimilation) when the message fell within the latitude of acceptance or nearby in the latitude of noncommitment (Sherif & Sherif, 1967). It was because individuals tended to categorize social and physical stimuli along meaningful psychological dimension when perceiving these stimuli (Sherif & Hovland, 1961) such that the message falling near the anchor (within the latitude of acceptance) would be

categorized as more similar to the anchor. In term of assimilation, the underestimation of discrepancy between the message actual position and its perceived position increased as the true discrepancy increased (Sherif & Sherif, 1967). On the contrary, the position of a message falling farther in the latitude of noncommitment or within the latitude of rejection would be contrasted farther away from one's attitude anchor than it truly was (Sherif & Sherif, 1967). Similarly, the overestimation of discrepancy in contrast grew when the true discrepancy was in fact larger (Sherif & Sherif, 1967). The message assimilated toward one's own attitude was more positively evaluated (regarded as "fair", "unbiased" and "factual") and therefore inducing positive attitude change (Sherif & Sherif, 1967). The degree of favorable attitude change was stronger when the magnitude of true discrepancy between the message position and one's attitude grew because it was associated with more assimilation and in turn more positive evaluation (Eagly & Chaiken, 1993). The opposite was true for contrasted messages. That is, greater level of overestimation of discrepancy was associated with more contrast and was thus evaluated more negatively by an individual and positive attitude change was in turn inhibited (Sherif & Sherif, 1967). In fact, extreme degree of discrepancy of contrasted message could even lead to negative or boomerang attitude change (attitudes in a direction opposing to that advocated in the message) (Eagly & Chaiken,

1993). Applying SJT to the case of the transport corporation, the extreme transport reliability statistics (99.9%) may fall farther in the latitude of rejection such that no attitude change or even boomerang attitude towards the public transport corporation is possible. To summarize, supposing the strongly favorable transport reliability statistics (99.9%) falls within the latitude of acceptance or nearby in the latitude of noncommitment, the corresponding amount of assimilation is positively related to positive attitude change. On the contrary, the amount of contrast induced when the strongly favorable transport reliability statistics (99.9%) falls within the latitude of rejection or farther in the latitude of noncommitment is negatively related to favorable attitude change.

H_{5a}: The *amount of assimilation* (the discrepancy between one's anchor and the message position when the message position lies within the latitude of acceptance or nearby in the noncommitment) experienced by the message recipient will be positively related to *favorable change in perceived reliability statistics.* The *amount of contrast* (the discrepancy between one's anchor and the message position that lies farther in the latitude of noncommitment or within the latitude of rejection) experienced will be negatively related to *favorable change in perceived reliability statistics*.

H_{5b}: The *amount of assimilation* experienced by the message recipient will be

positively related to *favorable change in service quality.* The *amount of contrast* experienced will be negatively related to *favorable change in service quality.*

H_{5c}: The *amount of assimilation* experienced by the message recipient will be positively related to *favorable change in value for money.* The *amount of contrast* experienced will be negatively related to *favorable change in value for money.*

Favorable change in perceived transport reliability statistics, perceived service quality and value for money

General attitude toward a company is the evaluation of various aspects (e.g. service and value for money) of the company. As one of the components involved in the evaluation of general attitude towards the public transport corporation, the favorable change in the perceived reliability statistics may transfer to more favorable change in general attitude toward the corporation.

H_{6a}: *Favorable change in perceived reliability statistics* will be positively related to *favorable change in service quality.*

H_{6b}: *Favorable change in perceived reliability statistics* will be positively related to *favorable change in value for money.*

To summarize, the current study proposed a model (as shown in Figure 1) combining the elements of Heuristics-Systematic Model (HSM) and Social Judgment Theory (SJT) in explaining persuasion by strongly favorable transport reliability

statistics specific to the case of a public transport corporation. There is no straight forward answer to whether and how individuals would be persuaded by the strongly favorable transport reliability statistics. It was the aim of the current study to provide a clearer picture of persuasion process when strongly favorable research statistics were employed to promote services specific to the context of the public transport corporation.

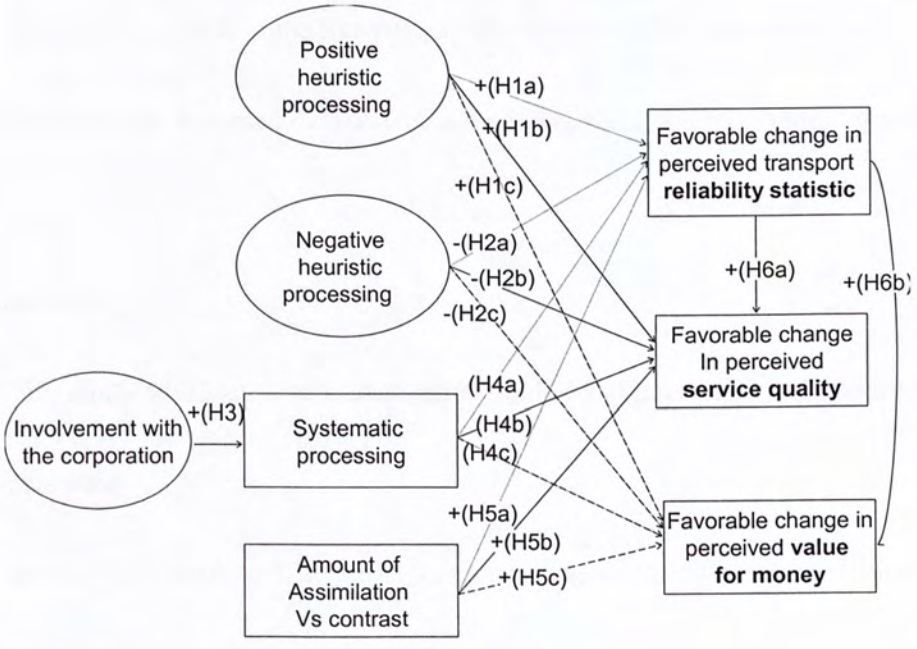


Figure 1. Proposed model. (Hypotheses toward different dependent variables were indicated by different types of line.)

Chapter 2. Method

Participants

There were 662 participants completing the online questionnaire of the current study. Participants were recruited through the mass mailing of the university, the personal network of the researcher and also as a part of the fulfillment of general psychology courses. To motivate participants to fill out the questionnaire, a lucky draw was held and each of the five participants received $500 as a reward. All participants have consumed the services provided by the public transport corporation before.

Procedures

This study consisted of two main parts – individual interviews and questionnaire administration.

Individual interviews. The individual interviews served two purposes. First, it was to examine if participants thoroughly understood parts of the items that would be included in the final questionnaire thoroughly. Second, it was to aid the development of instruments measuring heuristic processing and systematic processing. Participants first reported the transport reliability they thought the public transport corporation achieved and then read a message (i.e., a passage and a figure concerning the highly favorable transport reliability (99.9%) achieved by the company). Next,

participants indicated the transport reliability they thought the company achieved again and listed any ideas and thoughts that came across their minds after reading the message. After that, the researcher probed further information to understand the thoughts listed thoroughly as well as other factors affecting whether they were persuaded by the transport reliability statistics. Through this in-depth interview process, a set of comprehensive heuristic cues and systematic thoughts for why strongly favorable statistics failed or succeeded in promoting positive attitude towards the public transport company was identified. All the information obtained were analyzed and developed as the scales measuring heuristic processing and systematic processing. Finally, feedback was obtained from participants to further revise the items in the final questionnaire. In total, 21 individual interviews, which lasted for 10 to 20 minutes, were conducted. To have a more comprehensive picture of the potential factors involved in the information processing, participants of different age groups (ranging from 19 years old to 50 years old), gender (Female: 52.4%), education level (ranging from primary school to Ph. D. graduates) and occupation (Students: 42.9% and working: 57.1%) were interviewed. Some of the participants were invited to complete the interview at the station of the public transport corporation and others were recruited through the personal network of the researcher.

Questionnaire administration. The information gathered in the in-depth individual interviews assisted the development of the final questionnaire. Similar to the pilot study, the final questionnaire consisted of three parts. In the first part, participants completed a number of measures and indicated the transport reliability statistics that they believed the corporation achieved and the range of percentage they regarded as possible or not as a measure of the latitude of acceptance, noncommitment and rejection. In the second part, the message (i.e., a passage and a figure concerning the highly favorable transport reliability (99.9%) achieved by the company) was presented. After reading the message, participants reported the reliability statistics that they believed the company achieved again and completed the remaining measurements. At the end of the questionnaire, participants were to answer general demographic information and to leave their contact information if they were interested in participating in the lucky draw.

Measures

The measurement scales were either transformed based on existing literature or self-developed. They were composed into questionnaires and organized in three sections described below. Please refer to Appendix 1 for all the items in the questionnaire.

Section 1 – Attitude anchor towars the transport reliability statistics of the

company. A question concerning the transport reliability was asked (i.e., among the three-thousand train trips per day, what percentage or number of train trips would fail to let passengers arrive the station within five minutes of the normal schedule?). The answer to the above question measured the participant's personal attitude anchor toward the transport reliability achieved by the public transport corporation.

Section 1 – Amount of assimilation versus contrast. As the amount of assimilation is indicated by the discrepancy between one's anchor and the message position when the latter lies within the latitude of acceptance or nearby in the noncommitment whereas the amount of contrast refers to the discrepancy between one's anchor and the message position when the latter is farther in the latitude of noncommitment or within the latitude of rejection, to measure the amount of contrast and assimilation, a few steps were taken. Considering the 99.9% reliability (i.e. 0.1 failure rate) advocated in the message, the first step was to check whether participants chose the 0.1% failure rate as highly impossible, neutral or highly possible. Specifically, contrast took place if it was indicated as very unlikely while assimilation occurred if highly possible was chosen. For noncommitment, individual pattern of latitude of noncommitment was observed to determine if the 0.1% failure rate was nearby or farther in the latitude of noncommitment such that the former case was regarded as assimilation and the latter as contrast. To further determine the exact

amount of assimilation or contrast, the discrepancy between each participant's anchor and the message position (0.1% failure rate or 99.9 reliability) was computed. For instance, if one's anchor was 5% failure rate and the 0.1% failure rate advocated in the message was within her latitude of acceptance, the amount of assimilation would be positive 4.9%. Again, if one's anchor was still 5% failure rate, however, the 0.1% failure rate fell within her latitude of rejection, the amount of assimilation would be negative 4.9%.

Section 1 – Involvement scale. The 7-point (strongly disagree to agree) outcome-relevant and value-relevant involvement scales toward the brand of toothpaste was adopted to assess (Cho & Boster, 2005; Cronbach's alpha of .91), participants' outcome-relevant and value-relevant involvement with the public transport corporation. As the nature of involvement with toothpaste and public transport differs, after reviewing the content of Cho and Boster's (2005) 7-item involvement scale, 7 items of the outcome-relevant and 2 items of the value-relevant involvement scales were used in the current study. Sample items included "The level of change in transport reliability of the corporation has little impact on my life" (outcome-relevant involvement) and "The mean of transportation reflects who I am" (value-relevant involvement). The higher one's score, the more one is involved with the public transport company. Since the target participants were Chinese, the

involvement scale was translated from English into Chinese. The back-translation method was used, by which the measures were translated into Chinese by the author, who is bilingual in Chinese and English and back-translated into English by another student who was independent from the study. The discrepancies in the two versions were reconciled among the two translators to arrive at a version that was conceptually equivalent to the original scales.

Section 2 – The message of transport reliability statistics. After pressing the next button on that last page of section one, participants proceeded to the next page that instructed them to read the message - a passage and a diagram (please refer to appendix 1) about the transport reliability statistics extracted from the Pledge for Service of the public transport corporation. It was revealed in the message that the transport reliability of the public transport corporation reached 99.9%. Considering participants may want to change their previous answers after reading the hands-on information, the website was designed to inhibit them from returning to previous pages.

Section 3 – Favorable attitude change in perceived transport reliability statistics. Participants responded to questions regarding attitude toward the public transport company again. First, to measure the transport reliability that participants perceived the public transport corporation achieved, they answered the question

"Among the three-thousand train trips per day, what percentage or number of train trips would fail to let passengers arrive the station within five minutes of the normal schedule?" again. Taking into account that respondents might be affected by social desirability such that they regarded changing their attitude after reading the message as socially undesirable, participants were instructed to honestly report what they really thought about the transport reliability of the corporation when answering the question.

Section 3 – Favorable attitude change in perceived service quality and value for money of the public transport corporation. Two items asked respondents to evaluate how much their attitude toward the service quality and value for money of the public transport corporation changed after reading the message using a 7-point scale (change very negatively/positively) .

Section 3 – Positive heuristic processing, negative heuristic processing and systematic processing. To measure these three constructs, five scales including 1) systematic thoughts, 2) positive heuristic accessibility, 3) negative heuristic accessibility, 4) positive heuristic reliability and 5) negative heuristic reliability were developed. The section below illustrates the item development of the five scales, followed by the description of each of the scales and the three constructs.

Item development of the five scales. Although the existing researches

(Giner-Sorolla & Chaiken, 1997; Darke, Chaiken, Bohner, Einwiller, Erb & Hazlewood, 1998) asked participants to list any ideas and thoughts they came across after reading the message within 2 minutes, in the pilot study, participants revealed that they had difficulty to express and no motivation to list the thoughts that came across their minds. Thus, alternative scales – scales for heuristic accessibility and systematic thoughts were developed to measure heuristic and systematic processing in the current study. A thorough set of thoughts and ideas that came across participants' mind were revealed in the pilot study. Based on the definitions of heuristic and systematic processing (detailed rules are attached in Appendix 2), the researcher categorized these thoughts into evidence of heuristic and systematic processing. For instance, thoughts containing specific and logical arguments about the transport reliability statistics (e.g., whether the reliability statistics were believable concerning the computation method involved) were coded as evidence of systematic processing whereas those without specific and logical arguments (e.g., the transport reliability is trustable as statistics are always true) were coded as evidence of heuristic processing (Giner-Sorolla, & Chaiken, 1997). To ensure the reliability of the heuristic and systematic processing measurements, three raters who were blind to the experimental condition coded the thoughts and ideas identified in pilot study into evidence of heuristic or systematic processing based on definitions of heuristic and

systematic processing independently. Nine items for both positive and negative heuristic processing and 4 items for systematic processing that were coded consistently as either heuristic or systematic processing by three raters were retained. Thus, a high inter-rater reliability of the scales was achieved.

1) Scale of systematic thoughts. Unlike heuristic cues that usually specify the direction of a thought (E.g., "Organization must praise itself") systematic thoughts relate to arguments and logical reasoning without specifying the direction (E.g., "whether the transport reliability statistics was calculated in rush hours"). Hence, the scale of systematic thoughts was not divided into positive and negative perspectives. Participants simply indicated "yes" or "no" if they thought about the five items within the period that they read the message in section two and then reported the transport reliability statistics they perceived the company achieved in section three (i.e., the decision process).

2) Scale of positive heuristic accessibility and 3) Scale of negative heuristic accessibility. As mentioned above, heuristic cues could be positive or negative with reference to the direction of thoughts specified in the items. Thus, the 9 items measuring heuristic processing in general were further divided into the 5-item positive heuristic accessibility scale and the 4-item negative heuristic accessibility scale. Again, participants responded "yes" or "no" if they thought about the items

during the decision process.

4) Scale of positive heuristic reliability and 5) Scale of negative heuristic reliability. The scale of heuristic accessibility measured whether those heuristic cues were accessible to participants, whereas the scale for heuristic reliability measured how much they relied on the heuristic cues accessible to them. The heuristic cues for both the positive heuristic reliability scale and the negative heuristic reliability scale were identical to the positive and negative accessibility scales, however, the two reliability scales asked respondents to rate how much they agreed with each of those heuristic cues on a 7-point scale ranging from strongly disagree to strongly agree.

Three constructs -positive heuristic processing, negative heuristic processing and systematic processing. The five scales acted as indicators of the three constructs. First, systematic processing was simply indicated by the composite score on the scale of systematic thoughts. On the other hand, it was noted that even though participants agreed a lot with a heuristic cue but the cue was not accessible to them, this heuristic cue would have no effect on the perception of transport reliability statistics. Hence, the product of accessibility and reliability of heuristic cues was computed at the item-level, being the indicator of heuristic processing instead. Specifically, positive heuristic processing was the multiple of both the scales of positive heuristic accessibility and reliability. Similarly, negative heuristic processing was the multiple

of both the scales of negative heuristic accessibility and reliability. Moreover, an examination of the content of positive and negative heuristic processing items showed that they could be divided into two dimensions: (a) heuristic cues specific to the transport company, and (b) heuristic cues about statistics and researches in general. As a result, a bi-dimensionality of scales of positive heuristic processing and negative heuristic processing were proposed.

Chapter 3. Results

Validity Check

To check the consistency and reliability of participants' responses, four criteria were set to examine the responses. Violation of any of these criteria would lead to the discarding of the whole questionnaire. First, for the response to the first repeated item which is in the 7-point scale ("In general, research and statistics are meaningless and do not reflect the truth"), the whole questionnaire was discarded if its deviance was greater than one. Second, for the other two repeated items in the 2-point scale ("Because the company is of large scale, its transport reliability should be great" and "Whether my own experience with the company match with the transport reliability shown in the message?"), the whole questionnaire was discarded only if the deviances in both of the two items exceeded one. Third, two common knowledge questions (e.g. "which kind of transport does not exist in Hong Kong?" and the answer is the bullet train) were presented in the questionnaire. Incorrect response to anyone of these two questions would lead to discarding the whole questionnaire. Fourth, participants were eliminated systematically after investigating the logical rules concerning the pattern of latitudes of acceptance, noncommitment and rejection[1]. For instance, participants without latitude of rejection or acceptance were

[1] There were a number of logical rules concerning the pattern of latitudes of acceptance, noncommitment and rejection. According to the SJT, some individuals may not have a latitude of noncommitment on the attitude continuum. Thus, only participants with no latitude of rejection or

discarded. After the above validity check, a total of 104 set of questionnaire were discarded.

Demographic variables

Among the remaining 425 participants, 62.4 percent of them were female and 37.6 percent were male. Ninety percent of them held an education level of university degree or above. Considering the age of respondents, 61.2 percent of them were between the age of 20 to 24 and 30.4 percent were between 15 to 19. A majority (92%) of the participants were currently students.

Data Transformation

Before conducting the data analyses, the response distributions of the variable were examined. It was found that three variables, namely (a) *negative heuristic processing*, (b) favorable change in *perceived transport reliability statistics* and (c) *discrepancy between own attitude and message position* failed to achieve a normal distribution. For negative heuristic processing, about 53.2% of the participants had an average score of 0 on the 4 items (*Figure* 2). Because the message provided by the public transport corporation merely included favorable information regarding its services, participants might be primed to think from a

---

acceptance were discarded. Besides, it is illogical for an individual to have more than one latitude of acceptance along the attitude continuum. Imagine if an individual believed the first few ranges of statistics (e.g. 0-10%) and the last few ranges (50.1-100%) as possible (i.e. latitude of acceptance), one would not regard the middle percentages (10.1-50%) as neutral or impossible (latitude of noncommitment or rejection).

positive perspective rather than a negative one. In this light, *negative heuristic processing* was discarded from the study. The resultant model achieved a better fit (RMSEA = .077) than the model including negative processing (RMSEA = .114). For *perceived transport reliability statistics* as well as *discrepancy between own attitude and message position*, their distributions were positively skewed. Because value of these two variables can be either positive or negative, in order to preserve the sign of the variables, these two variables were transformed by a cube root transformation.

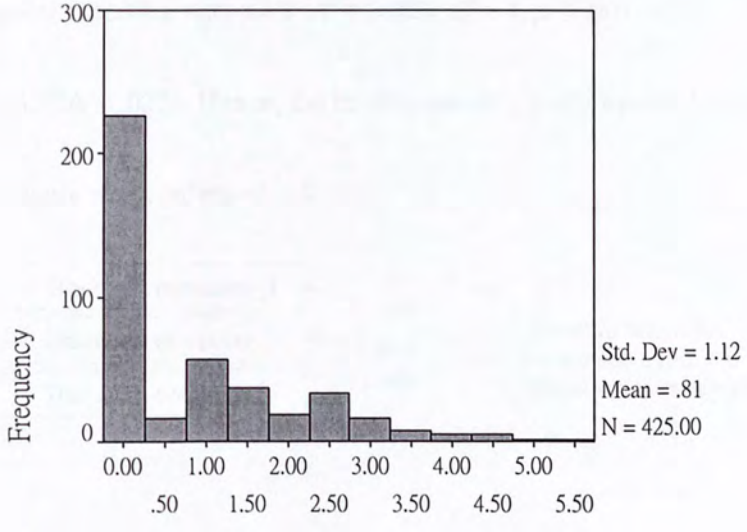


Figure 2. Skewed distribution of *Negative heuristic processing*

Dimensionality

Positive heuristic processing. The positive heuristic processing scale was the product of both positive heuristic accessibility and reliability scales. With reference to the content of the items, this self developed scale was proposed to consist of two dimensions namely the positive heuristic cues specific to the public transport

company and the positive heuristic cues about statistics and researches in general. To test the bi-dimensionality of the scale, conformation factor analysis was conducted. Goodness of fit was examined by CFI, GFI, and RMSEA. We follow the conventional guidelines that a CFI or GFI of above .90 can be considered as a good fit (Gefen, Straub & Boudreau, 2000). And for RMSEA, the conventional guideline is that a value not exceeding .06 is considered as a good fit, a value from .06-.08 as a fair fit, whereas a value from .08-.10 as a mediocre fit. According to Figure 3, the model fitted the data well ($X^2 = 5.063$, $df = 4$, $p < .001$; CFI = .998; GFI = .995; RMSEA = .025). Hence, the bi-dimensionality of *Positive heuristic processing* variable was confirmed.

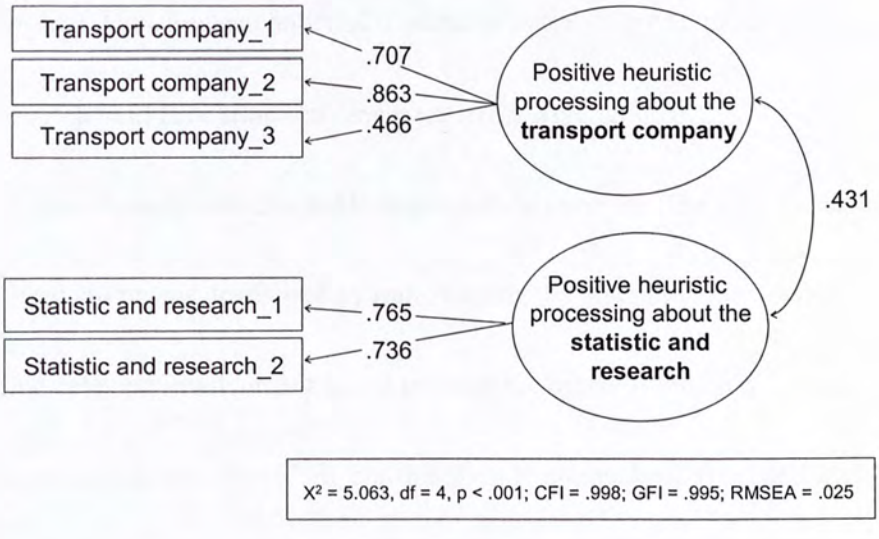


Figure 3. Bi-dimensionality of *Positive heuristic processing* (All paths were significant at p = .05 level.) (For simplicity the error terms were ignored.)

Systematic processing. Reviewing the five items in the self developed

systematic processing scale, all the items measured systematic thoughts concerning the use of statistics. According to Figure 4, the model fit the data well ($X^2 = 4.084$, $df = 2$, $p < .001$; CFI = .997; GFI = .995; RMSEA = .050). The uni-dimensionality of *Systematic processing scale* was confirmed by the confirmatory factor analysis.

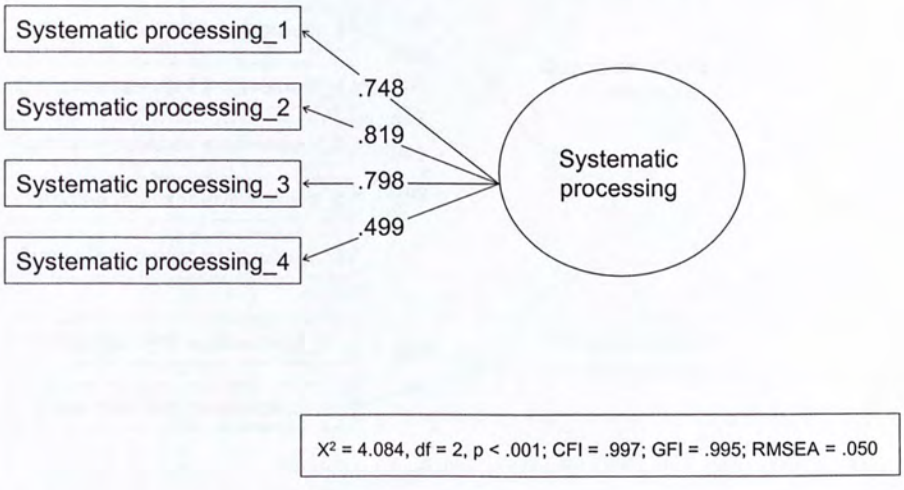


Figure 4. Uni-dimensionality of *Systematic processing* (All paths were significant at p = .05 level.) (For simplicity the error terms were ignored.)

Involvement with the public transport corporation. The involvement scale in the current study was developed by transforming the outcome-relevant and value-relevant involvement scales towards the brand of toothpaste created by Cho and Boster (2005). Therefore, confirmation factor analysis was conducted to ensure its bi-dimensionality. From Figure 5, although both CFI and GFI exceeded .90, RMSEA is .097 indicating a mediocre model fit ($X^2 = 129.070$, $df = 26$, $p < .001$; CFI = .940; GFI = .937; RMSEA = .097). While not all three fit indices converge to

indicate a very good fit of the model, after considering the magnitude of the indices and the theoretical relevance of the items, we accept with caution the bi-dimensionality of *Involvement with the public transport corporation* scale.

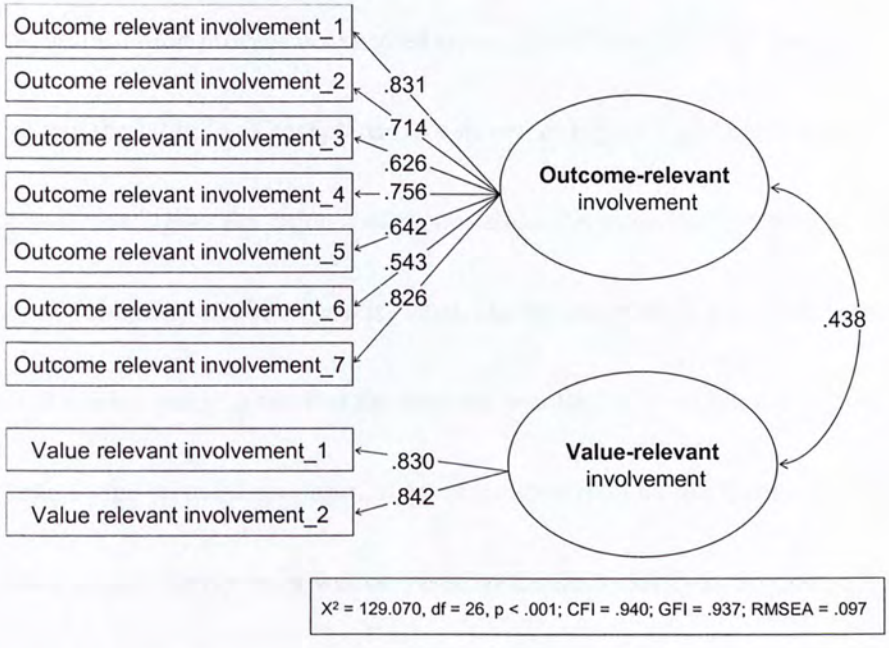


Figure 5. Bi-dimensionality of *Involvement with the public transport corporation scale* (All paths were significant at p = .05 level.) (For simplicity the error terms were ignored.)

Amount of assimilation Vs contrast and the *discrepancy between one's own attitude position and the message position*. Hypothesis 5 stated that when the message position falls within a person's latitude of acceptance (a process of assimilation), there will be more favorable attitude change as the discrepancy between the message position and the person's initial position increases. On the contrary, when the message position falls within a person's latitude of rejection (a process of contrast),

there will be less favorable attitude change as the discrepancy between the message position and one's initial position increases. However, exploring the data closely, the data pattern was not totally consistent with the proposed hypothesis. According to SJT, an assimilation process is expected among participants that the message position falls within the latitude of acceptance. As shown in Figure 6 and consistent to the hypothesis, the higher the amount of assimilation, the more favorable the change in *perceived reliability statistics* was induced. On the other hand, a contrast process is expected among participants that the message position falls within the latitude of rejection. In the contrast condition, it was hypothesized that the favorable change in *perceived reliability statistics* will decrease as the discrepancy between one's own attitude and the statistics advocated in the message increases. Figure 7 showed that the amount of favorable change actually increased as the amount of discrepancy increased, which did not support the notion of a contrast effect. Consistently, the correlation between the amount of *contrast* and *favorable change in perceived reliability statistics* was .326 ($p < .01$), which was opposite to the negative direction hypothesized. Thus, hypotheses 5a and b were rejected suggesting the failure of Social Judgment Theory in this case. In fact, many of the researches failed to support the role played by assimilation and contrast in influencing attitude change (Eagly & Chaiken, 1993). Similarly, Rhine and Severance (1970) also found that attitude

change increased as discrepancy between own attitude and the position of persuasive communication (concerning the amount of increased tuition or new park area) increased. From the data observed in this study, there is a monotonic increasing functional relation between discrepancy (between the message position and own attitude) and attitude change (i.e., as discrepancy increases, attitude change increases). In other words, it is expected that *discrepancy* is positively related to *favorable change in perceived reliability* (H7a), *favorable change in service quality* (H7b) and *favorable change in value for money* (H7c) in the SEM. In addition, although no contrast effect suggested by SJT was found in the current study, 15.3% of participants in fact experienced a negative change in perceived transport reliability.

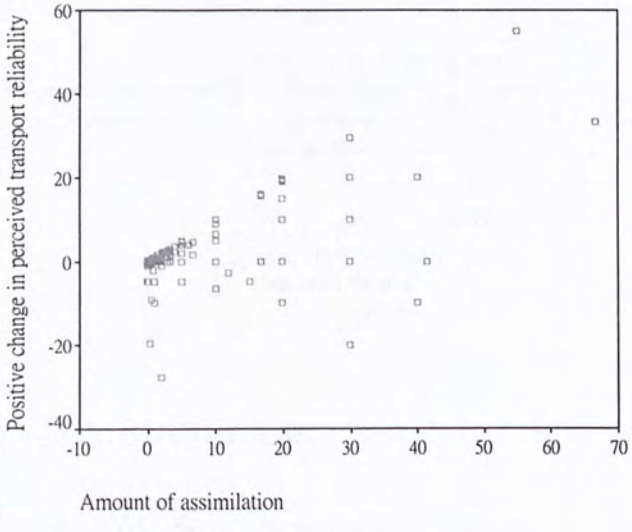


Figure 6. Scatterplot for participants for whom 99.9% transport reliability fell within the *latitude of acceptance* (i.e., assimilation expected)

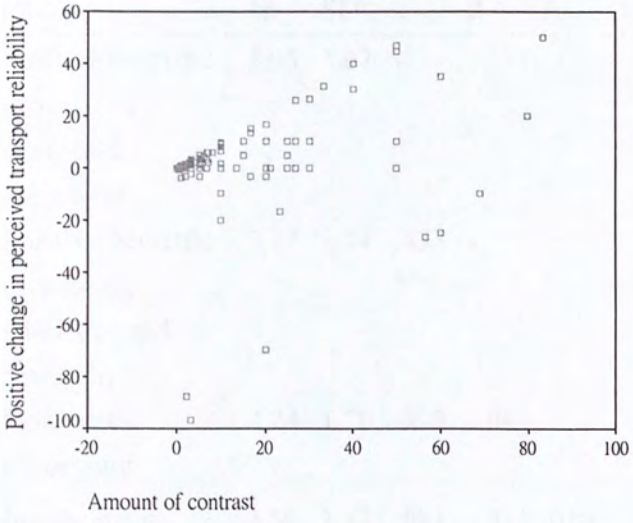


Figure 7. Scatterplot for participants for whom 99.9% transport reliability fell within the *latitude of rejection* (i.e., contrast expected)

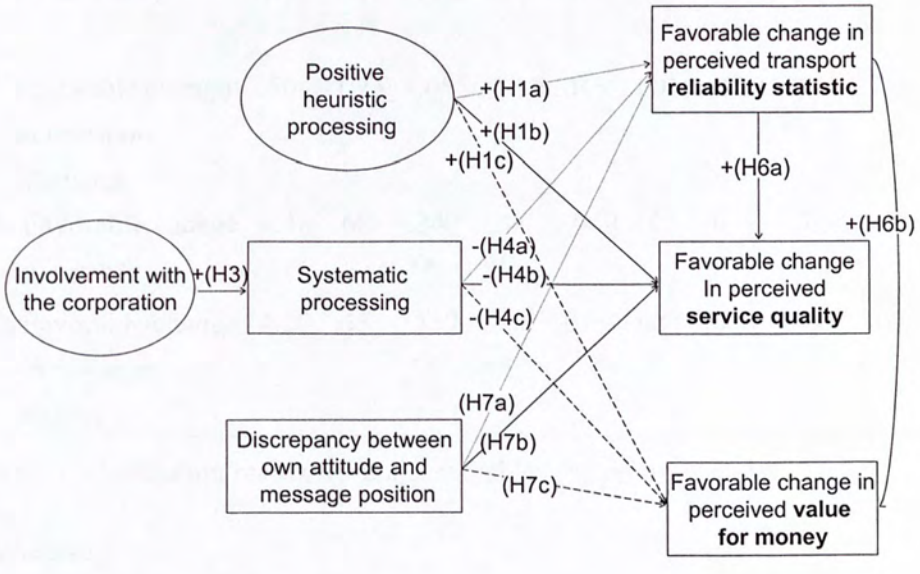


Figure 8. The revised model

Favorable change in perceived transport reliability statistics, perceived service quality and value for money of the public transport corporation. Each of the three constructs was measured by one indicator only. Hence, the uni-dimensionality of

each of these three constructs was assumed.

Variables	*M*	SD	1	2	3	4	5	6	7	8
1. Positive heuristic processing (transport company)	3.95	1.67	-	.						
2. Positive heuristic processing (statistics and research)	3.77	1.94	.433**	-						
3. Systematic processing	2.24	1.70	.025	-.062						
4. Involvement (outcome)	4.59	1.13	.081	-.011	.019					
5. Involvement (value)	4.26	1.43	.146**	.126**	.079	.380**				
6. Discrepancy	1.32	1.02	-.085	.068	.074	.025	.020			
7. Favorable change in transport Statistics	.50	1.23	-.055	-.019	.045	.001	-.008	.391**		
8. Favorable change in service	4.46	.68	.240**	.209**	-.049	.025	.035	-.019	.147**	
9. Favorable change in value for money	4.20	.55	.137**	.266**	.015	.047	.060	-.045	.109*	.495**

Table 1. Correlation matrix for major variables (** $p \leq .01$; * $p \leq .05$)

Reliability

The Cronbach's alphas of 4 scales ranged from .69 to .86, which could be regarded as achieving a satisfactory to good reliability: *Positive heuristic processing* (5 items, $\alpha = .71$), *Systematic processing* (4 items, $\alpha = .69$) and *Involvement with the public transport corporation* (9 items, $\alpha = .86$).

Model testing results

Structural equation modeling (SEM) approach was used to test the hypothesized model. A common problem – "Heywood case" that may occur because of bad prior estimates or sampling error appeared when testing the model. Specifically, a condition code indicated that an error variance was constrained at lower bound. The traditional remedy to set the error variance to 0.001 was employed in this case. From Figure 10, the proposed model fit the data quite well as the CFI and GFI exceeded .90 (indicating a good fit) and RMSEA was slightly larger than .06 but smaller than .08 (indicating a fair fit) ($X^2 = 74.125$, $df = 21$, $p < .001$; CFI = 1; GFI = .965; RMSEA = .077). All the standardized path coefficients are in Figure 9.

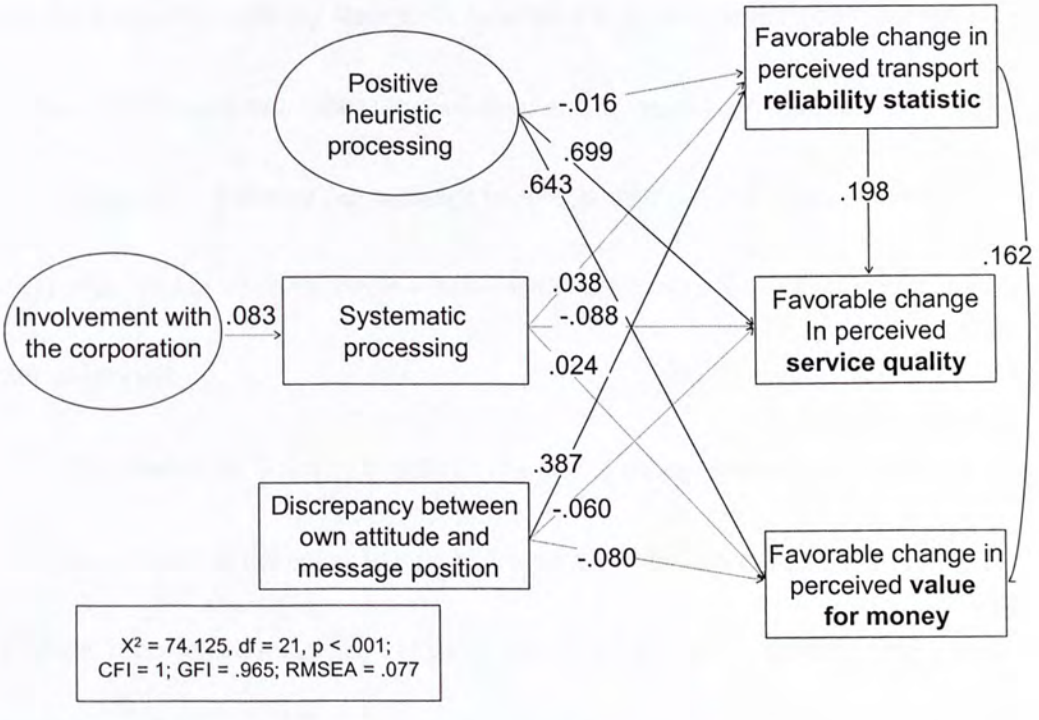


Figure 9. Result of structural equation modeling. (Significant paths were marked

with * and in solid line.) (For simplicity the error terms and the measurement paths were not shown.)

Hypothesis testing

The favorable effect of *positive heuristic processing* on positive attitude change towards the public transport corporation was only partially supported. Hypothesis 1a specifying the path from *positive heuristic processing* to *favorable change in perceived reliability statistics* was insignificant. However, hypotheses 1b and c specifying the path from *positive heuristic processing* to *favorable change in service quality and value for money* respectively were supported. In other words, message recipients who engaged more in *positive heuristic processing* when reading the 99.9% transport reliability statistics would have more favorable attitude change in *service quality* and *value for money* of the public transport corporation.

Hypothesis 3 stating that message recipients who endorse high *involvement with the public transport corporation* would engage more in *systematic processing* was not supported.

Hypothesis 4a, b and c regarding *systematic processing* were not supported. As shown in Figure 9, the respective paths from *systematic processing* to *favorable change in perceived reliability statistics*, *service quality* and *value for money* were insignificant. *Systematic processing* played limited role in affecting the attitude

towards the transport company of participants.

The effect of *discrepancy between the message position and one's own position* was partially supported. Specifically, hypothesis 7a stating the positive path from *discrepancy* to *favorable change in perceived reliability statistics* was significant. However, hypotheses 7b and c indicating the positive path from *discrepancy to favorable change in service quality* as well as *value for money* were insignificant

Finally, hypotheses 6a and b were significant that favorable change in *perceived reliability statistics* was positively related to favorable change in *service quality as well as value for money*. In turn, *discrepancy* exerted a significant indirect effect on favorable change in *service quality* (indirect path coefficient = .077) and *value for money* (indirect path coefficient = .063) through favorable change in *perceived reliability statistics.*

Chapter 4. Discussion

The current study proposed a model (as shown in Figure 8) combining the Heuristics-Systematic Model (HSM) and Social Judgment Theory (SJT) to explain persuasion by strongly favorable reliability statistics specific to the case of a public transport corporation. The results provided some meaningful and new understandings of the persuasion process when strongly favorable research statistics was employed to promote services specific to the public transport corporation. However, we shall interpret the model with caution as the various fit-indices suggest a slightly mixed-picture. Whereas the CFI and GFI indices met the conventional guideline of a good model fit (both values were larger than .90), the RMSEA index fell between a good fit (the conventional guideline of .06) and a fair fit (.08).

The effect of discrepancy between one's own attitude and message position on favorable change in perceived transport reliability

Exploring the data pattern, no evidence of assimilation and contrast was found. This rejected SJT and suggested that latitudes of acceptance and rejection do not matter. The results indicated a significant effect of *discrepancy* on favorable change in *perceived reliability statistics* such that the larger the absolute *discrepancy* between the message position and one's own position, the more favorable change in *perceived transport reliability* was induced (hypothesis 7a supported). It was

speculated that when there was a difference between the transport reliability one assumed the transport corporation achieved from the reliability advocated in the company message, participants might find it really impressing so that even if the 99.9% reliability statistics fell within their latitudes of rejection, they were still persuaded. Thus, the greater the *discrepancy*, the more impressed the participant, and this led to more favorable attitude change. Originally, according to the social judgment theory, it was suggested that the strongly favorable statistics might backfire if it fell within one's latitude of rejection. The present findings suggested that strongly favorable statistics was promising in inducing more favorable attitude change in *perceived transport reliability*. Moreover, in that other factors examined were not significantly related to favorable attitude change in *perceived transport reliability*, practitioners should thus focus their efforts on improving their service levels and then make use of strongly favorable statistics to promote their services.

The effect of favorable change in perceived transport reliability

Favorable change in *perceived reliability statistics* exerted significant direct effects on both favorable change in perceived *service quality* and *value for money.* This suggested that when customers perceived the transport reliability to be better, it directly led to a more favorable perception of *service* and *value for money* of the company. Thus, practitioners can benefit from enhancing favorable change in

perception of *transport reliability* as it could lead to a better general attitude of the company. Also, *discrepancy* exerted significant indirect effects that lead to a favorable change in *service quality* (indirect path coefficient = .077) and *value for money* (indirect path coefficient = .063) through a favorable change in *perceived reliability statistics*. Hence, actual improvement in *transport reliability* not only enhances *perception* of transport reliability, it also enhances perceptions in service quality and value for money.

The strong effect of positive heuristic processing and general attitude change

The strongest predictor of general attitude change (in terms of *service quality* and *value for money*) was *positive heuristic processing*. *Positive heuristic processing* exerted a stronger direct impact on favorable change in *service quality* as well as *value for money* than favorable change in *perceived reliability.* Specifically, participants who relied more on *positive heuristic processing* had more positive change in *service quality*. Such a strong reliance on *positive heuristic processing* in affecting positive general attitude change toward the public transport corporation might be due to different reasons. First, although heuristic processing could be controlled and intentional, when compared with systematic processing, it was used more spontaneously and automatically (Chaiken, Liberman & Eagly, 1989). Moreover, according to the efficiency principle, individuals seemed to minimize

cognitive capacity used to determine message validity (Chaiken et al., 1989). Therefore, it was not surprising for participants to rely more on the less effortful heuristic processing modes to determine attitude change. Also, some heuristic cues were well-represented in memory and regarded as more reliable by most people (Chaiken et al., 1989). Thus, the results might reflect the salience of heuristic cues induced by the message. For example, positive heuristic cues such as "Statistics as a kind of expertise can be trusted" and "The service provided by public organizations should be satisfactory" were well-established, highly available and reliable in participants' memory. Consequently, when they read the message containing positive information about the public transport company, the well-established positive heuristic cues were made accessible and participants relied heavily on these well-established positive heuristic cues in forming better general attitude toward the transport corporation.

P*ositive heuristic processing* could predict the general attitude change in terms of *service quality* as well as *value for money* directly rather than *perceived reliability statistics*. Alternatively, *discrepancy* between one's own attitude and message position was directly related to favorable change in *perceived reliability statistics* but not general attitude change. Even though *discrepancy* exerted a significant indirect effect on favorable change in *service quality* through favorable change in *perceived*

reliability statistics, we can conclude that p*ositive heuristic processing* had a stronger link with favorable attitude change whereas *discrepancy* shared a closer relationship with *perceived reliability statistics.* We suspected that it was because positive heuristic cues were more general in nature (e.g., "The service provided by public organizations should be satisfactory") rather than focusing on a particular facet of the company services. Concerning the level of analysis, the more general nature of positive heuristic cues should better predict general attitude change but not the specific transport reliability. Similarly, the *discrepancy* between the message position and one's own belief was directly referring to the transport reliability statistics. A previous study has also revealed that participants would move their judgments concerning health behavior toward health behavior statistics presented in a message without any attitude change (Campo, Cmeron, Brossard & Frazer, 2004). This could also be the reason why *discrepancy* could only directly predict the change in *perceived reliability statistics* but not general attitude change.

The limited role played by systematic processing

Systematic processing failed to affect either favorable change in *perceived reliability statistics* or positive change in *general attitude.* Participants basically relied on the *discrepancy* between the message position and their own attitudes when determining the perceived reliability statistics and *positive heuristic processing* for

the general perception of the transport corporation but not *systematic processing*. It should be noted that HSM model only assumed that systematic processing and heuristic processing might, but not necessarily co-occur (Chaiken et al., 1989). Particularly, owing to the fact that systematic processing taxed one's cognitive capacity, it does not occur in all persuasion settings (Chaiken et al., 1989). Probably, the positive heuristic cues induced by the current message were really regarded as well available and reliable such that participants have generated enough confidence level by merely employing *positive heuristic processing* so that the need to rely on *systematic processing* was reduced in this case. In addition, some research has found that individuals relied more on systematic processing only when the ability for systematic processing was not disrupted by situational variable such as time pressure (Chaiken et al., 1989). Although no time limit was imposed on participants, they might have low commitment to the study as they participated merely for fulfilling the course requirement or for the prize incentive (Reips, 2000). With low commitment to the study, it was suspected that they might want to finish the questionnaire as soon as possible. When the ability for systematic processing was undermined, participants might switch to rely on heuristic processing to determine attitude change.

Moreover, result indicated that even participants who were more *involved with the transport corporation* did not engage more in *systematic processing* as

hypothesized. The lack of information provided in the message might have inhibited systematic processing. According to Chaiken et al. (1989), the persuasive impact of heuristic processing would be maximal when people were restricted to use more than negligible amount of systematic processing. In the questionnaire, the message basically described the statistic and services provided by the company without more in-depth information for systematic processing. Even though the highly involved participants would like to adopt systematic processing, they might be constrained to do so.

Implications for practitioners

By understanding how customers process information related to strongly favorable research statistics, the current study provides practitioners with insights into the implementation of strongly favorable research statistics to promote their services. First, although it was suspected that the use of information related to strongly favorable statistics might cause a boomerang effect, results showed that it in fact led to favorable change in the *perceived reliability statistics* and *general attitude* towards the company. Hence, it is worthwhile for practitioners to invest in conducting research and make use of strongly favorable statistics to promote their services.

Acknowledging the benefits brought by strongly favorable statistics, attention

should be given to the design of the information related to strongly favorable research statistics. Results revealed that favorable change in p*erceived reliability statistics* was only significantly predicted by the *discrepancy* between the message position and one's own attitude. In this light, companies must strike to achieve strongly favorable service statistics (e.g., a long-term vision to improve their service qualities as much as possible) so as to maximize the difference in service level advocated in the company message and the attitudinal anchor held by customers.

Although strongly favorable transport reliability statistics improve customers' perceptions of the transport reliability and general attitude (in terms of *service quality* and *value for money*) toward the company. Reviewing the finding of the present study, *positive heuristic processing* was the strongest predictor of improved perception of service quality and *value for money* of the company. To maximize the improvement in general attitude, practitioners should include positive heuristic cues in the information related to the strongly favorable statistics reported by the company.

Finally, to maximize the cost-effectiveness of investment, practitioners could save money and effort for areas other than information related to systematic processing. Result showed that *systematic processing* was neither related to improved perception of *reliability statistics* and *general attitude*. Even worse,

opposing to the traditional findings of HSM, involved participants did not adopt more *systematic processing*. At the same time, according to the efficiency principle, participants who are less involved are unlikely to engage in systematic processing. This illustrates that the mode of systematic processing was worthless when persuading customers using strongly favorable research statistics in this case. Thus, when designing the message containing the strongly favorable statistics, attention and resources should be spent on enhancing positive heuristic processing by including positive heuristic cues (e.g. "As a public organization founded for so many years…" and "Objective research statistics was presented below…" etc.) explicitly in the message.

Limitation of the present study and further research direction

The current study enhances our understanding of the persuasion process of strongly favorable statistics and implications were suggested for practitioners. Nevertheless, there were some limitations of the study to be considered. The most important limitation is that the present model achieved a fair goodness of fit only. It might be related to the limitation of measurements employed. Since the model fit of a measurement (involvement with the corporation) was fair and the reliabilities of scales ranged from satisfactory to good only, it may have affected the fit of the entire model. It is suggested that the measures should be refined and further researches are

needed to improve the model fitness. Although caution should be taken when interpreting the present study results as the RMSA exceeded . 06 slightly, considering both CFI and GFI exceeded .90, it is believed that the current study findings were supported with a reasonable level of confidence.

The results of the current study opposed the contrast effect suggested in SJT. Although this new finding might suggest the special nature of persuasion by strongly favorable statistics (the credibility generated by the expertise), it could be related to the limitation of measurements as mentioned above. Moreover, as mentioned in the result before, although no contrast effect suggested by SJT was found in the current study, 15.3% of participants in fact experienced negative change in perceived transport reliability. It was outside the scope of the present study to determine whether these negative changes were genuine or from playful participants only. Thus, replication of the study is necessary to enhance the confidence of conclusions drawn.

Another limitation was the problem of generalizability. As most of the participants were students, it was questionable if the findings could be generalized to other population segments. Moreover, a majority of participants attained a university degree or above. It was suspected that the exposure to research statistics among people with different education level might differ. Hence, the processing of strongly favorable statistics might vary with different education levels. Additionally, the

present study was industry specific by adopting the message used by a public transport corporation. Depending on the nature of the company, the associated heuristic cues and the kinds of research statistics generated can be different. Therefore, caution should be taken when generalizing the current study results to other settings and populations. To arrive at a generalized conclusion, it is essential to test the model across population segments and industries.

The self-report nature of the questionnaire was another limitation of the study. With respect to the rationale behind the proposed model, the questions in the questionnaire were quite complicated. Although effort was taken by conducting a pilot study and providing detailed instructions, there is no way to be totally certain that respondents shared the same interpretation of the questions. Further, demand characteristics suggested that participants might have guessed the rationale underlying the research and answered accordingly. In addition, although practices have been taken to minimize the adverse effect of social desirability, respondents might also be affected by this bias such that they regarded changing their attitudes after reading the message as socially undesirable. All these might have biased the results of the study.

Finally, the current study was among the first to explore the persuasion process of strongly favorable statistics. Together with the fact that more and more

organizations employ strongly favorable statistics to promote their services, more research in this area is warranted. For instance, researcher can explore whether past experience with the company would affect the persuasion effect of strongly favorable statistics.

Appendix 1: Measurement items

Positive heuristic processing

Positive heuristic processing about the transport company

(Transport company_1) 因爲地鐵提供公共服務，其列車的準時程度應該不錯
As the transport corporation is providing public service, its transport reliability should be quite good.

(Transport company_2) 因爲地鐵是大型機構，其列車的準時程度應該不錯
As the transport corporation is of large scale, its transport reliability should be quite good.

(Transport company_3) 地鐵的服務一向不錯
The service provided by the transport corporation has always been quite good.

Positive heuristic processing about statistics and research

(Statistics and research_1) 基本上數據是一種可信的資料
Basically, statistics are credible information.

(Statistics and research_2) 基本上調查或研究是一種可信的資料來源
Basically, survey or research is a kind of credible information.

Systematic processing

(Systematic processing_1) 資料中的地鐵準時程度數據是由地鐵公司自己計算，並非由獨立公司計算出來，因此數據一定正面
The transport corporation rather than an independent organization calculated the reliability statistics, hence the statistics must appear favorable.

(Systematic processing_2) 地鐵公司會否運用了一些技巧使其準時程度顯得正面(如不報告不好的數據)
Whether the transport corporation utilizes some skills to make its statistics appearing more favorably (e.g., not reporting poor statistics) or not.

(Systematic processing_3) 日常接觸到有關地鐵的報導是否合理或真確
Whether those news or reports regarding the transport corporation I encountered are true or not.

(Systematic processing_4) 我是否知道資料中的地鐵準時程度是如何計算出來的(如是否計算所有班次及路線)
Whether I know how the transport reliability statistics were computed or not (e.g., if all the trains and routes

were included).

Involvement scale

(Outcome relevant involvement_1) 地鐵列車是否準時對我的生活造成影響
Whether the train is reliable or not has impact on my life.

(Outcome relevant involvement_2) 我容易聯想到地鐵列車的準時程度可如何影響我的生活質素
It is easy for me to think of ways the train reliability affects my life.

(Outcome relevant involvement_3) 地鐵列車是否準時對我的家庭生活造成影響
Whether the train is reliable or not has impact on my familial life.

(Outcome relevant involvement_4) 地鐵列車是否準時對我的工作造成影響
Whether the train is reliable or not has impact on my job.

(Outcome relevant involvement_5) 我的生活質素與地鐵列車的準時程度沒有什麼關係 (reversed item)
The quality of my life is not associated with the train reliability (reversed item).

(Outcome relevant involvement_6) 地鐵列車是否準時對我的消閒生活造成影響
Whether the train is reliable or not affects the entertainment I enjoy.

(Outcome relevant involvement_7) 地鐵列車準時對我的日常生活有影響
Whether the train is reliable or not has impact on my everyday life.

(Value relevant involvement_1) 我選擇的交通工具是否準時反映了我的爲人
My choice of transportation reflects who I am.

(Value relevant involvement_2) 我選擇的交通工具是否準時反映了我爲人處事的重要原則
My choice of transportation is relevant to the core principles that guide my life

Change in transport reliability statistics

地鐵每日開出 **3000** 班列車，而每班列車均有預定的車程時間。你估計當中有**幾多班列車**比預定車程時間用**多過 5 分鐘**才能把乘客送到目的地出閘（你可理解爲比預定時間遲到多過 5 分鐘）…

_____次 **或** _____ % (你只需作答**次數或%**便可)

Among the three-thousand train trips per day, what percentage or number of train trips would fail to let passengers arrive the station within five minutes of the normal schedule?

Favorable change in perceived service quality of the public transport corporation

整體來說，閱讀 C 部份有關地鐵列車準時程度的資料後有否**改變**你對**地鐵服務的印象**？

To what extent does your attitude toward the service quality of the public transport corporation change after reading the message in Part C?

Favorable change in perceived value for money of the public transport corporation

閱讀 C 部份有關地鐵列車準時程度的資料後有否**改變**你對搭地鐵是否**物有所值的看法**？

To what extent does your attitude toward the value for money of the public transport corporation change after reading the message in Part C?

Appendix 2: Categorization of heuristic and systematic processing

Characteristics of heuristic processing

1. When making judgment, one only focuses on a subset of information that enables one to rely on simple rules of thumb or cognitive heuristics/shortcuts (such as "experts' statements can be trusted") (Tversky & Kahneman, 1974).
2. It is a more superficial level of processing. Less cognitive effort and resources are required and results in more rapid judgment.
3. The statement or thought may NOT be directly and logically issue-related (In this case, the issue is the level of MTR punctuality.)
    - For example, considering "The environment of MTR is good.", this thought is not directly and logically related to the issue – the punctuality of MTR, and it is a heuristic thought as one may generalize the positive aspect of MTR environment to MTR punctuality.
4. A thought is stated in a statement but the statement does NOT provide specific and logical argument to explain the reason behind the thought stated.
    - For example, in the statement of "the train punctuality statistics is trustable as statistics are always true", no specific and logical argument is suggested to explain why statistics are always true.

Characteristics of systematic processing

1. It is a more comprehensive and analytical information processing mode where much information was accessed and scrutinized by perceivers to judge the message (Eagly & Chaiken, 1993)
2. It requires more cognitive effort and resources.
3. The statement or thought is directly and logically issue-related (In this case, the issue is the level of MTR punctuality.)
    - For example, considering "I have thought of whether the train is repaired regularly.", it is a systematic thought as it considers a factor – train repairing, which is directly and logically related to the issue – the level of MTR punctuality.
4. The statement contains specific and logical argument to explain the reason behind the thought stated.
    - For example, "the train punctuality statistics are not believable as the method of data collection is not presented" is a systematic thought.

References

Bohner, G., Ruder, M., & Erb, H. P. (2002). When expertise backfires: Contrast and assimilation effects in persuasion. *British Journal of Social Psychology, 41(4),* 495-519.

Campo, S., Cmeron, K. A., Brossard, D., & Frazer, M. S. (2004). Social Norms and Expectancy Violation Theories: Assessing the Effectiveness of Health Communication Campaigns. *Communication Monographs, 71(4),* 448-470.

Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology, 39(5),* 752-766.

Chaiken, S. (1987). The heuristic model of persuasion. In M. P. Zanna, J.M. Olson, & C. P. Herman (Eds.). *Social influence: The Ontario Symposium* (Vol. 5, pp.3-39). Hillsadale, NJ: Erlbaum.

Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic information processing within and beyond the persuasion context. In Uleman, J. S. (Ed.) Bargh, J, A. (Ed.). *Unintended thought.* (pp. 212-252). New York, NY, US: Guilford Press.

Chaiken, S., & Eagly, A. H. (1983). Communication modality as a determinant of persuasion: The role of communicator salience. *Journal of Personality and*

Social Psychology, 45(2), 241-256.

Cho, H., & Boster, F. J. (2005). Development and Validation of Value-, Outcome-, and Impression-Relevant Involvement Scales. *Communication Research, 32(2),* 235-264.

Darke, P. R., Chaiken, S., Bohner, G., Einwiller, S., Erb, H. P., & Hazlewood, J. D. (1998). Accuracy motivation, consensus information, and the law of large numbers: Effects on attitude judgment in the absence of argumentation. *Personality and Social Psychology Bulletin, 24(11),* 1205-1215.

Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes.* Orlando, FL, US: Harcourt Brace Jovanovich College Publishers. xxii, 794 pp.

Eagly, A. H., & Telaak, K. (1972). Width of the latitude of acceptance as a determinant of attitude change. *Journal of Personality and Social Psychology, 23(3),* 388-397.

Gefen, D., Straub, D.W., & Boudreau, M.C. (2000). Structural equation modeling and regression: guidelines for research practice. *Communication of the Association for Information Systems*, 4(7), 1-77.

Giner-Sorolla, R., & Chaiken, S. (1997). Selective use of heuristic and systematic processing under defense motivation. P*ersonality and Social Psychology Bulletin, 23(1),* 84-97.

Hsu, C. K., 1999. The moderating effects of product type and consumer knowledge on consumers' responses to objective versus subjective information in print persuasive communications. (Doctoral dissertation, University of Illinois at Urbana-Champaign, US, 1999) *Dissertation Abstracts International Section A: Humanities and Social Sciences, 59(11-A),* 4222.

Hsu, M. H., Yen, C. H., Chiu, C. M., & Chang, C. M. (2006). A longitudinal investigation of continued online shopping behavior: An extension of the theory of planned behavior. *International Journal of Human-Computer Studies, 64,* 889–904.

Johnson, B. T., & Eagly, A. H. (1989). Effects of involvement on persuasion: A meta-analysis. *Psychological Bulletin, 106(2),* 290-314.

Reips, U. D. (2000). The web experiment method: Advantages, disadvantages, and solutions. In Birnbaum, M. H (Ed). P*sychological experiments on the Internet.* (pp. 89-117). San Diego, CA, US: Academic Press.

Rhine, R. J., & Severance, L. J. (1970). Ego-involvement, discrepancy, source credibility, and attitude change. *Journal of Personality and Social Psychology,16(2),* 175-190

Sherif, M., & Hovland, C. I. (1961). S*ocial judgment: Assimilation and contrast effects in communication and attitude change.* New Haven, CT: Yale

University Press.

Sherif, M., & Sherif, C. W. (1967). Attitude as the individual's own categories: The social judgment-involvement approach to attitude and attitude change. In C. W. Sherif & M. Sherif (Eds.), *Attitude, ego-involvement and change* (pp.105-139). New York: Willey.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185,* 1124-1131.

Zaccaro, S. J., & Horn, Z. N. J. (2003). Leadership theory and practice: Fostering an effective symbiosis. *The Leadership Quarterly, 14,* 769-806.